

## **REMARKS**

### **I. Introduction**

Claims 21 to 42 are pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

### **II. Objection to Claims 21 to 40**

Claims 21 to 40 were objected to due to “informalities.” Regarding claim 21, while the objection may not be agreed with, to facilitate matters, claim 21 has been amended herein without prejudice to change “correctional factors” to --correctional values--, thereby obviating the present objection with respect to claim 21.

Further, the Office Action asserts that “the ‘generating from the string of results’ and ‘accumulating’ steps ... becomes confused ... because the ‘generated string of results’ (i.e. ‘d’) is only fed as input to the COMBINATION UNIT 8 for ‘accumulating’ and can not create ‘correctional factors.’” Office Action, pp. 3 to 4. Applicant respectfully disagrees. In this regard, the Substitute Specification states at page 5, lines 25 to 27, that optionally, “this combining unit is combined with the filter (integrator) to form one unit.” Further, the Substitute Specification states at page 9, lines 11 to 25, that “the values of string of results d are supplied to a filter in the form of an integrating unit 9.” See also p. 11, lines 4 to 6; and p. 14, lines 14 to 18. Therefore, it is respectfully submitted that claims 21 and 40, as presented, do not require correction, as suggested by the Office Action.

### **III. Rejection of Claim 29 Under 35 U.S.C. § 112, Second Paragraph**

Claim 29 was rejected under 35 U.S.C. § 112, second paragraph as allegedly indefinite. The Office Action states that “one skilled in the art is unable to determine a definite meaning for a ‘fractional proportion’ of an address sequence.” Office Action, p. 3. It is respectfully submitted that a fractional proportion of an address sequence is described in the Specification, e.g., at page 3, lines 23 to 34; and from page 4, line 20 to page 5, line 4.

Accordingly, it is respectfully submitted that the present claims sufficiently “set forth and circumscribe a particular subject matter with a reasonable

degree of clarity and precision,” which is all that is required under 35 U.S.C. § 112, second paragraph.

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

**IV. Rejection of Claims 21 to 24, 26, 27 and 30 to 42 Under 35 U.S.C. § 103(a)**

Claims 21 to 24, 26, 27 and 30 to 42 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of U.S. Patent No. 5,079,549 (“Liessner”) and U.S. Patent No. 5,134,578 (“Garverick et al.”). It is respectfully submitted that the combination of Liessner and Garverick et al. does not render unpatentable the present claims for at least the following reasons.

Claim 21, as presented, relates to a method for interpolating at least two position-dependent, periodic analog signals that are phase-shifted with respect to one another and which are generated by scanning a measuring scale. Claim 21 recites that the method includes, *inter alia*, converting each of the analog signals into a digital data stream by a sigma-delta modulator; generating from the string of results (a) new correctional values in accordance with a quality criterion that is to be satisfied during interpolation and (b) output signals of the interpolation; accumulating over a specifiable time interval values of the string of results for generating the correctional values and the output signals; and using a signal sequence generated by the accumulation as an address sequence for generating the correctional values and for generating the output signal. Claims 40 to 42, as presented, include features analogous to those included in claim 21, as presented.

The Office Action plainly admits on pages 6 to 7 that Liessner does not disclose converting by a sigma-delta modulator. However, the Office Action refers to Garverick et al. for disclosing sigma-delta analog to digital converters. The Office Action’s reference to Garverick et al. is not entirely understood, since the entire functionality and structure described by Liessner is **analog** and not in any manner **digital**. In this regard, Liessner describes that the input signal to the system is an **analog** representation of a displacement and that an encoder 10 provides **analog** signals to multipliers 12, 14. Col. 3, lines 15 to 21. Liessner further describes that each multiplier 12, 14 provides an **analog** signal to adder 20. Col. 3, lines 41 to 44. Thus, there is no disclosure, or even any suggestion, by Liessner of converting analog signals, which are generated by scanning a measuring scale, into a digital

data stream by a sigma-delta modulator or otherwise. Furthermore, the only conversion described by Liessner between analog and digital signals is in connection with multipliers 12, 14, which are described by Liessner as being **digital-to-analog** (not **analog-to-digital**) converters that cause a **digital input** to attenuate an analog current reference signal. Thus, Liessner in no manner describes, or even suggests, an **analog-to-digital** conversion. Indeed, even the output signal ES is described by Liessner as being an **analog** error signal. Col. 3, lines 43 to 44. There is no discussion whatsoever by Liessner of whether, how or even why any of the **analog** devices might be modified to **digital** devices or whether or how **digital** data streams might be handled. For example, the proposed modification would change the entire principle of operation of the resolver described by Liessner, e.g., the modification would require substantial reconstruction and redesign of the components described by Liessner as well as a change in the basic principle under which the device described by Liessner was designed to operate. As such, the proposed modification is insufficient to render obvious the present claims. In re Ratti, 270 F.2d 810, 123 U.S.P.Q. 349 (C.C.P.A. 1959) (if the proposed modification would change the principle of operation of a prior art device being modified, then the references are insufficient to render the claims prima facie obvious). Moreover, the mere reference to sigma-delta analog to digital converters in Garverick et al. does not in any manner cure the critical deficiencies set forth above.

In addition, Liessner does not disclose, or even suggest, generating from the string of results new correctional values in accordance with a quality criterion, as provided for in the context of claims 21, and 40 to 42, as presented. The Office Action asserts that the “output of error ‘DETECTOR’; ‘ES>0’ or ‘ES<0’” constitutes a quality criterion. Office Action, p. 6. Applicant respectfully disagrees. In this regard, a quality criterion is described, for example, in Substitute Specification, e.g., at page 9, lines 27 to 31; and p. 13, lines 20 to 30. In contrast, the outputs of the DETECTOR of Liessner merely indicate the counting direction of the ASYNC COUNT GENERATOR 24 and thus, merely relate to the direction of movement measured by the encoder. Col. 4, lines 18 to 26. Therefore, Liessner does not disclose, or even suggest, generating from a string of results new correctional values in accordance with a quality criterion, as provided for in the context of claims 21, and 40 to 42, as presented. In addition, Garverick et al. does not cure, and is not even asserted to cure, this critical deficiency of Liessner.

Further, Liessner does not disclose, or even suggest, accumulating over a specifiable time interval values of a string of results for generating correctional values and output signals; and using a signal sequence generated by an accumulation as an address sequence for generating correctional values and for generating output signals, as provided for in the context of claims 21, and 40 to 42, as presented. The Office Action asserts that the ASYNC COUNT GENERATOR 24 of Liessner, which includes the DISABLE PULSE GENERATOR 29, accumulates over a specifiable time interval values of a string of results. Office Action, p. 6. Applicant respectfully disagrees. In contrast, as more fully set forth above, the ASYNC COUNT GENERATOR of Liessner merely increases or decreases the count. Further, the DISABLE PULSE GENERATOR, based on the rate of change of the error signal ES, merely switches between two operating modes: single-stepping mode, and multi-stepping mode, which modes merely enable or disable the lookup tables 16, 18, the multipliers 12, 14, and the adder 20. Col. 4, lines 29 to 38; col. 6, line 64 to col. 7, line 20; and col. 5, lines 1 to 11. Therefore, Liessner does not disclose, or even suggest, accumulating over a specifiable time interval values of a string of results for generating correctional values and output signals, as provided for in the context of claims 21, and 40 to 42, as presented. Further, since Liessner does not disclose the accumulating step, Liessner also does not disclose, or even suggest, using a signal sequence generated by an accumulation as an address sequence for generating correctional values and for generating output signals, as provided for in the context of claims 21, and 40 to 42, as presented. In addition, Garverick et al. does not cure, and is not even asserted to cure, this critical deficiency of Liessner.

Based on the foregoing, it is plainly apparent that the combination of Liessner and Garverick et al. does not disclose, or even suggest, all of the features included in claims 21, and 40 to 42. As such, the combination of Liessner and Garverick et al. does not render unpatentable claims 21, and 40 to 42. Furthermore, the Office Action does not set forth sufficient rationale to support the contention that claims 21, and 40 to 42 are rendered unpatentable by the combination of Liessner and Garverick et al. in accordance with KSR International Co. v. Teleflex Inc., 550 U.S. \_\_\_, 82 U.S.P.Q. 1385 (2007) or the "Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR

International Co. v. Teleflex Inc.,” 72 Fed. Reg. 57526 (Oct. 10, 2007) (“the Guidelines”).

While the Office Action contends that “[o]ne skilled in the art would be . . . motivated to complete the conversion because of the advantages provided by digital implementations of analog devices,” the Office Action plainly fails to adequately set forth a prima facie case of obviousness based upon a motivation-to-combine rationale consistent with KSR or the Guidelines. As stated in the Guidelines, to reject a claim based on a motivation-to-combine rationale, Office personnel **must** resolve the Graham factual inquiries **and then** articulate: (1) a finding that there was some teaching, suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the reference teachings; (2) a finding that there was a reasonable expectation of success; **and** (3) whatever additional findings based on the Graham factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness. The Office Action has completely failed in this regard. Accordingly, a prima facie case of obviousness has not been adequately set forth in the Office Action.

Thus, in view of all of the foregoing, it is respectfully submitted that the combination of Liessner and Garverick et al. does not render unpatentable claims 21, and 40 to 42.

As for claims 22 to 24, 26, 27 and 30 to 39, which ultimately depend from and therefore include all of the features included in claim 21, it is respectfully submitted that the combination of Liessner and Garverick et al. does not render unpatentable these dependent claims for at least the reasons more fully set forth above in support of the patentability of claim 21.

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

#### **V. Rejection of Claim 25 Under 35 U.S.C. § 103(a)**

Claim 25 was rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Liessner, Garverick et al. and that which the Office Action considers to constitute admitted prior art. As an initial matter, Applicant does not necessarily agree with the contention that the Specification contains an admission that “low-pass filtering and assignment of the address values is well known in the

art.” Notwithstanding the foregoing, it is respectfully submitted that the combination of Liessner, Garverick et al. and the alleged admitted prior art does not render unpatentable claim 25 for the following additional reasons.

Claim 25 ultimately depends from and therefore includes all of the features included in claim 21. As more fully set forth above, the combination of Liessner and Garverick et al. does not render unpatentable claim 21, from which claim 25 ultimately depends. The alleged admitted prior art does not cure the critical deficiencies of the combination of Liessner and Garverick et al. As such, the combination of Liessner, Garverick et al. and the alleged admitted prior art does not render unpatentable claim 25, which ultimately depends from claim 21. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) (any dependent claim that depends from a non-obvious independent claim is non-obvious).

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

#### **VI. Rejection of Claims 28 and 29 Under 35 U.S.C. § 103(a)**

Claims 28 and 29 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Liessner, Garverick et al. and U.S. Patent Application Publication No. 2002/0116181 (“Khan et al.”). It is respectfully submitted that the combination of Liessner, Garverick et al. and Khan et al. does not render unpatentable claims 28 and 29 for at least the following reasons.

Claims 28 and 29 ultimately depend from and therefore include all of the features included in claim 21. As more fully set forth above, the combination of Liessner and Garverick et al. does not render unpatentable claim 21, from which claims 28 and 29 ultimately depend. Khan et al. do not cure the critical deficiencies of the combination of Liessner and Garverick et al. As such, the combination of Liessner, Garverick et al. and Khan et al. does not render unpatentable claims 28 and 29, which ultimately depend from claim 21. Id.,

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

**VII. Conclusion**

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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By: /Clifford A. Ulrich/  
Clifford A. Ulrich  
Reg. No. 42,194

KENYON & KENYON LLP  
One Broadway  
New York, New York 10004  
(212) 425-7200  
**CUSTOMER NO. 26646**